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121	<u>L72</u>	all
228	<u>L71</u>	
152	<u>L70</u>	all
152	<u>L69</u>	
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L59 156 and (e-mail or "electronic mail" or "microsoft outlook" or "lotus notes")

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L58 L57 not@py>1996

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L57 (hierarch or hierarchy or hierarchical) near2 folders

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L56 (hierarch or hierarchy or hierarchical) near2 folders

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L51 (electronic near mail or e-mail or outlook or "lotus notes")

108402 L51

L50 122 not @py>1996

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5793970 | 5890147 | 5588107)! [PN]

17 L49

L48 ("6073137") [PN]

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L47 ("5819295") [URPN]

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L41 5924090.pn.

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L39 ("5832470") [PN]

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L38 5832470.pn.

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L31 L30 and (rank\$ or weight\$)
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L29 L28 and mapp\$
L28 (hierarchical or hierarch or hierarchy) and folders
L27 (document with folder with mapping or document near folder near mapp\$ or document adj folder adj mapp\$)
L26 L23 and ("lotus notes" or "microsoft outlook")
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J Takkinen - 1997 - ida.liu.se

... as cars, cats, chairs, and flowers (Wasser- man 1995). ... are used for structuring and retrieving **electronic** information ... discussions; while in e-mail folders are ...

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... and transferred digitally as e-mail attachments ... working on the same document in **electronic** form, which ... mechanism based on either **hierarchical folders** or metadata ...

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... such as Moulthrop's Victory Garden (1995) or ... about text-based **electronic mail** as the most widely used ... organised in a system of **hierarchical folders**; on the ...

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It includes NFS for UDP or TCP, remote login (telnet, rlogin, supdup) with a variety of terminal emulators, file transfer (FTP, TFTP, rcp), **electronic mail ...**

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Les Versions de Lotus Notes

Dans la suite de l'historique de la création de Lotus Notes, voici les grandes étapes de l'évolution du produit après sa première sortie. Voici la liste des versions existantes à l'heure actuelle :

Version 1.0

Version 2.0

Version 3.0

Version 4.0 et 4.5

Version 5.0

Finalement, nous aurons un bref regard sur la Version 6 de Notes et Domino.

Release 1.0: A star is born

The first release of Notes shipped in 1989. During the first year it was on the market, more than 35,000 copies of Notes were sold. The Notes client required DOS 3.1 or OS/2. The Notes server required either DOS 3.1, 4.0, or OS/2.

Release 1.0 provided several "ready to use" applications such as Group Mail, Group Discussion, and Group Phone Book. Notes also provided templates that assisted you in the construction of custom applications. This ability to design customizable applications using Notes led to a business partner community that designed Notes applications. Today, thousands of companies build their own software products that run on top of Notes, but the founders didn't expect Notes to be a "developers' product." They envisioned a shrink-wrapped PC communications product that would run right out of the box. In reality it became both.

Release 1.0 offered the following functionality, much of it revolutionary in 1989:

- Encryption, signing, and authentication using the RSA public-key technology, which allows you to mark a document in such a way that the recipient of the document can decisively determine that the document was unmodified during transmission. Notes was the first important commercial product to use RSA cryptography, and from this point on, users consider security as a prime feature of Notes.

- Dialup functionality, including the ability to use the dialup driver for interactive server access, the ability to allow users to specify modem strings, support for operator-assisted calling, and automatic logging of phone call activity and statistics.

- Import/export capability, including Lotus Freelance Graphics metafile import, structured ASCII export, and Lotus 123/Symphony worksheet export.

- Ability to set up new users easily, including allowing system/server administrators to create a user mail box, to create a user record in the Name and Address database, and to notarize the user's ID file through dialog boxes. You can also automatically create a user's private Name and Address database, in case that user wants to use private distribution lists.

- An electronic mail system that allows you to send mail without having to open your private mail file, to receive return-receipts, to be notified when new mail arrives, and to automatically correct ambiguous or misspelled names when creating a mail message.

- Online help, a feature not offered in many products at this time.

- Inclusion of the formula language, making the programming of Notes applications easier.

- DocLinks providing "hotlink" access between Notes documents.

- Keyword (checkbox and radio button) features.

Access Control Lists (ACLs) determining who can access each database, and to what extent.

Ability to administer remote replicas of databases from a central place, if the database manager desired that behavior. You can replicate ACLs as an entire list, not just individual entries, to remote copies of the database.

Release 1.1

The first set of enhancements to Notes became available in 1990. Release 1.1 was not a feature release, but an internal restructuring of the code that included new portability layers. The developers made a large architectural investment in Notes as a multi-platform product. They wrote a large amount of the product insulating the functional parts of Notes from the operating system. This means that, although Notes ran on many platforms, the developers didn't port the code from platform to platform. They developed the code for different operating systems in parallel. Already, this investment began to pay off. In this release of Notes, they began to support additional operating systems, OS/2 1.2 Extended Edition, Novell Netware Requester for OS/2 1.2, and Novell Netware/386. However, their biggest achievement and the focus of this release was the added support for Windows 3.0, which was achieved by working closely with Microsoft as an influential beta site for Windows 3.0.

Release 2.0: Bigger and better

The next major release of Notes shipped in 1991. For Release 2.0, scalability became the focus. After Release 1.0 sold to large companies, Lotus realized Notes needed to scale to support 10,000 users. Notes was initially intended for small to medium sized businesses. The founders' original vision did not include large companies as users; they only expected 25 or so people logging in to one server. The reason for this was that the PCs of the day didn't have a lot of power. As the PCs and their networks became more powerful, so did Notes.

Throughout the 1990s, as Notes accommodated more and more users, larger companies bought it. Sales growth was slow but steady, as Lotus sold the product to high end customers willing to invest time and effort getting large groups of users up and running. As these early customers used Notes with great success, the installed user base grew.

Originally, there was a 200-license minimum for Notes; Lotus did not sell individual copies. As a result, the minimum purchase price was \$62,000. Lotus targeted big companies because they felt that only those companies would comprehend and exploit the potential of the product. Price Waterhouse and other early test sites showed that the big companies would get it.

Tim Halvorsen remembers that as Notes slowly began to grow, so did the development team. By the second release, there were approximately 12 developers working on Notes. For the early releases, Halvorsen says, "We were very responsive to the needs of our customers, but then we also tried to build it with the ability to accommodate future changes in the industry."

Release 2.0 included the following enhancements:

- C Applications Programming Interface (API)
- Column totals in views
- Tables and paragraph styles
- Rich text support
- Additional formula language @ functions
- Address look-up in mail
- Multiple Name and Address books
- Return receipt for mail memos
- Forwarding documents via mail
- Larger databases and desktop files

Release 3.0: Notes for everyone

Notes Release 3.0 shipped in May 1993. By this time, Iris had about 25 developers working on Notes. Release 3.0 was build number 114.3c. This means it was the 114th successful build of Notes ever and that it took three tries to complete the final build.

At the time of the release, more than 2,000 companies and nearly 500,000 people used Notes. The goal of Release 3.0 was to build further on what Notes already was, to make the user interface cooler and more up-to-date, and to evolve it further as a cross-platform product. Lotus began to aim the product at a larger market and reduced the price accordingly. Release 3.0 featured the first of a series of rewrites of the database system, NIF, to try to make the product scale to even larger user populations. This release was suitable for about 200 users simultaneously using a server.

Release 3.0 also added greater design capability, and many additional features, including:

- Full-text search
- Hierarchical names, views, forms, and filters
- Additional mobile features, including background replication
- Enhanced scalability
- Alternate mail capability
- Development of common API strategies for cross-platform Notes applications
- Selective replication
- Support for AppleTalk networks
- Deployment and administrative improvements
- Support for the Macintosh client
- A server for the Windows operating system

Lotus SmartSuite shipped in 1993 with a Bonus Pack, called Notes F/X that allowed applications to share data and still integrate the data in a Notes database using OLE.

In May 1994, Lotus purchased Iris Associates, Inc. This had very little effect on the product itself, but it did simplify some of the pricing and packaging issues surrounding Notes. In May 1995, Lotus released InterNotes News, a product that provided a gateway between the Internet news sources and Notes. This was the first project that reflected the growing influence of the Internet on Notes.

Release 4.0: A whole new look

In January 1996, Lotus released Notes Release 4.0. This release offered a completely redesigned user interface based on customer feedback. This interface exposed and simplified many Notes features, making it easier to use, program, and administer. When the developers gave a demonstration of the new user interface at Lotusphere (a yearly user group meeting), they received a standing ovation from the crowd of customers.

The product continued to become more scalable. It became faster and faster as companies added additional processors to a multiprocessor server.

Lotus cut the price of Notes in half, and thus successfully gained a larger market share.

In addition, Notes began to integrate with the Web, and many new features reflected the prominence of Web technology in the industry. Ray Ozzie, the first Notes developer and founder of Iris Associates, saw the importance of the Web before the Web became the phenomenon it is today. This was a key element in the success of Notes. A new product called the Server Web Navigator, allowed the Notes server, connected to the Web, to retrieve pages off the Web, and then allowed users to view the pages in a Notes client.

Another product that leveraged the Web was a server "add-in" called the InterNotes Web Publisher.

Now users could take a Notes document, convert it to HTML, and display it in a Web browser. The server could statically take Notes documents and publish them to the Web. It was not yet dynamic, because there was a time delay involved in this process. The documents went to the file server and were later published to the Web.

Release 4.0 also offered:

- LotusScript, a programming language built into Notes
- A three-paned UI for mail and other applications, with document preview ability Passthru servers
- A new graphical user interface for server administrators
- Built-in Internet integration, including Web browser accessible Notes databases
- Upward mobility, including locations and stacked icons
- An enhanced replicator page
- Rapid application development and programmability, as a result of an Integrated Development Environment (IDE), infoboxes, and redesigned templates
- View, folder, and design features, including the ability to create action bars, the ability to create navigators that allow easy graphical navigation among views, and improved table support
- Search features, such as the ability to search a database without indexing it, and the ability to add conditions to a search with the Search Builder without writing a formula
- Security features, such as the ability to keep local databases secure and the ability to restrict who can read selected documents
- Internet server improvements including, SOCKS support, HTTP proxy support, and Notes RPC proxy support

In July 1995, IBM purchased Lotus, primarily to acquire the Notes technology. The buyout impacted Notes in a positive way. Prior to the buyout, the Notes developers felt that they were facing some strategic uncertainty as a result of the growing prominence of the Web and increasing competition in the market. The IBM acquisition provided solid financial backing, access to world class technology, including the HTTP server that became Domino, and an increased sales force. Notes now sold to very large Fortune 500 companies, and it sold to entire corporations instead of just departments. These positive gains gave the developers of Notes the freedom to invest in long-term projects. In 1996, following the release of Notes 4.0, the business and technological competition exploded-for messaging products, for Web servers, and for development systems for these products.

The development of Release 4.0 took more than two years, which in light of the growing competition and the shorter development cycles of competitors using the Web to release products, was now too long. In order to give large enterprises a highly stable Notes system, but also to ensure that Iris Associates would continue its tradition of technical leadership, the developers divided the Notes product line into the following two branches:

A product line of new feature releases, beginning with Release 4.5, would offer first-rate new functionality in the fastest development cycle possible while still maintaining good quality. Market competition and the needs of the software vendors building applications on top of Notes, influenced these releases. 90 day releases, also called "quarterly maintenance releases," would contain few or no new features. Maintenance input from existing Notes customers almost entirely drove this second product line. Many of these customers were the large-enterprise users who heavily stressed the server and were among the first to find deployment-blocking bugs. The sole purpose of these releases was to gather up fixes for bugs, test them in an integrated manner, and make them available to licensed customers. These releases were more conservatively managed than the new feature releases, and they were appropriate for large companies who were more interested in a highly stable release of the product than in pioneering brand new technology. A third digit in the product release number designated maintenance releases, such as the 3 in 4.5.3.

Even today, at any particular time, there are two Notes families (or two "code streams") maintained this way, while a third code stream is underdevelopment for the next feature release.

New users had a choice as to the release of Notes they could buy. Most new users received the current feature release. As time passed, most users began to combine the releases, so that on some machines they took advantage of the new feature release, while other machines ran a maintenance release version. These two releases of the product did merge at certain points in the development process. When coding started for a new feature release, all the code from past releases, including the bug fixes were merged together and a new code stream began. This merging process happened a few times early in the development process of the new feature release. This merging process ensured that the reliability of feature releases was high.

Release 4.5: The Domino theory

Lotus changed the brand name of the Notes 4.5 server product to "Domino 4.5, Powered by Notes" in December 1996, and shipped the Domino 4.5 server and the Notes 4.5 client. Domino transformed the Notes Release 4.0 server into an interactive Web applications server. This combined the open networking environment of Internet standards and protocols with the powerful application development facilities of Notes. Domino provided businesses and organizations with the ability to rapidly develop a broad range of business solutions for the Internet and intranets. The Domino server made the ability to publish Notes documents to the Web a dynamic process.

Release 4.5 provided the following improvements:

- Messaging, including native Notes Calendaring and Scheduling, SMTP/MIME support (SMTP MTA), cc:Mail network integration (cc:Mail MTA), POP3 support (on the Notes server), and a Mobile corporate directory
- Internet server, including Domino.Action, and multi-database full-text searching

- Personal Web Navigator, including client-side retrieval of HTML pages over HTTP, Personal Web Navigator database, Java applet execution, Netscape plug-in API support, and HTML 3.2 support

- Scalability and manageability, including Domino server clusters, directory assistance, Administration Process enhancements, new database management tools, Windows NT single logon support, and Notes/NT user management

- Security, including Execution Control Lists, and password expiration and reuse

- Programmability, including Script Libraries, OLE2 support on the Macintosh, extended OCX support, LotusScript enhancements, and IDE enhancements

- Enhanced application development capability with support for Java 1.1 agents and Java-based access to Notes objects

- Seamless Web access from the Notes client

- Ability to hide design elements from a Web browser or a Notes client if necessary

Release 5.0: Web integration by design

Notes and Domino Release 5.0 shipped in early 1999, as the 160th build since 1984. The R5 code was a direct descendent of Release 1.0 and parts of its architecture still supported Release 1.0 clients. But, while backwards compatible, R5 was definitely moving into the future.

With R5's continued Web integration, it was no longer a question of Notes versus the Internet, they became inseparable. The new user interface for R5 illustrated this by taking on more browser-type

characteristics. R5 also supported more Internet protocols and extended its reach to include access to information stored in enterprise systems as well as Notes databases.

For application developers, Domino Designer, the successor to Lotus Notes Designer for Domino, offered significant enhancements that make development more productive. Domino Designer is an integrated development environment with the tools needed to rapidly build and deploy secure e-business applications.

The new Domino Administrator made Domino network administration easier with a redesigned user registration and new tools for server monitoring and message management. Important enhancements to the Domino server included:

Internet messaging and directories, including full-fidelity messaging, native MIME and SMTP support, the new Directory Catalog, and LDAP features

Expanded Web application services, including CORBA-standard distributed objects, Java, JavaScript, Web clusters, and Microsoft Internet Information Server (IIS) HTTP services

Database improvements such as transaction logging and a new on-disk structure (ODS)

Release 5.0. was available on Windows NT, Windows 95, Windows 98, OS/2, Netware, and UNIX. This wide availability, combined with its ability to entwine Notes with the Internet, set a new standard for: Easy access to all the information that is important to you, be it personal or public

Server independence, because of the ability to use Notes with Domino R5 as well as other Internet-standard servers

The ability to read and send messages to any Internet mail server, without needing to know about Internet standards, thanks to one, consistent interface

The latest innovations in Internet messaging with native support for all the major Internet standards

On the Notes Client side, R5 provided easy access to all the information that is important to you-whether that information is personal (like your e-mail and calendar) or public (like your favorite Web sites and Internet newsgroups). The Notes client included a new browser-like user interface with a customizable Welcome page for tracking your important daily information. It also included improvements to the applications you use in your daily work, such as mail, calendar and scheduling, Web browsing, and discussions. As interface designer Robby Shaver says when discussing the R5 client, "The number one goal is to just make the client easier."

The Future: Notes/Domino 6 and beyond

Notes/Domino 6 is the next release of Domino and Notes. Currently in Pre-release, it can be downloaded from the LDD Web site. Notes/Domino 6 provides many new, state-of-the-technology features. These range from improved overall usability to extended strength in client mobility.

Notes/Domino 6 boasts enhancements in the Welcome Page, messaging, Calendar and Scheduling, and performance. The Notes client capitalizes on the innovation of Notes R5 and refines the end-user experience, all without requiring incremental system resources.

For more information on Notes/Domino 6, see:

Notes 6 Technical Overview

Domino Designer 6 Technical Overview

Domino 6 Technical Overview

And although it may seem a little early to look past Notes 6 and Domino 6 (which after all haven't even been released yet), the development team is already doing just that. Al Zollar, at Lotusphere 2002, spoke of some of the early visions planned for upcoming releases of Notes and Domino. And despite all its many changes over the years, much of the original vision of Notes/Domino remains intact today. Notes/Domino is "an information processing agent," says Tim Halvorsen. "Notes/Domino serves up the information acquired from a variety of sources." Halvorsen adds that the fundamental

change over time is that the scope of Notes/Domino has become much wider. But there's still plenty of room for growth. "We haven't done everything we can do with Notes/Domino."

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IEEE JNL IEEE Journal or Magazine

IEE JNL IEE Journal or Magazine

IEEE CNF IEEE Conference Proceeding

IEE CNF IEE Conference Proceeding

IEEE STD IEEE Standard

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Publication Date: 11 Dec 1989

On page(s): 3/1 - 3/3

Meeting Date: 12/11/1989

Location: London

INSPEC Accession Number: 3602882

Posted online: 2002-08-06 16:57:10.0

Abstract

Part of the system software of a well-known range of personal computers with a direct mouse interface is specified. This software is referred to as product M, and the computers as product P. It provides a visual interface to a hierarchical file system. Files, discs, and **folders** (directories) are represented by icons on the screen. They may be moved or copied from place to place by dragging them with the mouse. Dragging an icon into the 'trash can' discards it. Discs and **folders** may be 'opened' in a window on the screen in which their contents can be viewed. These aspects of product M are specified in the Z specification language and the specification style developed at Oxford. The specification is a very abstract description of product M, to which more detail is added step by step. The Z specification is used to build more detailed specifications from simpler ones, and to combine several detailed specifications to form the complete specification. This allows the specification of a relatively complex system to be broken down into several simple parts, each specifying one aspect of the overall system. The specification is inspired by Sufrin's specification of an **electronic mail** system (B.A. Sufrin).

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